

Skin Protection Dilemma: Testing Detects Benzene in Some Sun Care Products

Wendee Nicole

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Benzene is a known human carcinogen,¹ so consumers should not expect to find it in personal care products.² Nevertheless, between April 2021 and April 2022, companies issued 11 recalls for hand sanitizers, sunscreens, deodorants, and hair and foot care products contaminated with the chemical.³ In a recent study in *Environmental Health Perspectives*, scientists from Valisure, an independent laboratory, evaluated benzene levels in sunscreen and after-sun products.⁴

Benzene may show up in personal care products as a manufacturing by-product, for instance from petrochemicals used in aerosol propellants, gelling agents, or fragrance ingredients, the authors explain.⁴ The U.S. Food and Drug Administration (FDA) prohibits companies from intentionally adding benzene to regulated products, with one narrow exception: When benzene use is unavoidable for manufacturing a product that is a “significant therapeutic advance,” it may be present at concentrations up to 2 ppm.⁵

Valisure started out as an online pharmacy.⁶ Scientists there first discovered benzene in sunscreen products during routine testing of the products they sold. They followed up with testing

of 293 sun care products purchased between September 2020 and May 2021—many of which also contained benzene.⁴ On 24 May 2021 the company filed a citizen petition⁷ with the FDA requesting, among other things, a recall of the benzene-contaminated lots, support for independent testing programs, and collaboration between the FDA and the U.S. Environmental Protection Agency to address benzene contamination of consumer products. On 21 November 2021, the FDA responded that it needed more time to address the petition “because it raises complex issues requiring extensive review and analysis by Agency officials.”⁸

For the new paper, the authors crowdsourced an additional 368 samples sent in by U.S. and Canadian consumers. The authors accepted the crowdsourced products—sometimes partially used—in their original containers. In all, they tested 661 samples representing 108 brands and more than 400 unique UPCs. The products included aerosol and pump spray products, lotions, creams, gels, and sticks.

The results showed that 29% of samples tested positive for benzene, with levels above 2 ppm in 11% of the tested products.



A given brand of sunscreen may have very high benzene levels in one lot and none in another, says coauthor Kaury Kucera, highlighting the need for manufacturers to implement batch-level quality assurance testing. Image: © iStockphoto/ozgurcankaya.

“One brand may have very high benzene levels in one lot, and the same brand may have no detectable benzene in another lot,” says Valisure chief scientific officer Kaury Kucera, who coauthored the study. “This highlights the immense complexity of the supply chain and the need for batch-level independent quality assurance to be added to the existing manufacturing system.”

Crowdsourced products were more likely than unopened, newly purchased items to contain high levels of benzene, and nearly 20% of the crowdsourced products were expired. The FDA urges consumers not to use sunscreens that are expired or more than 3 years old, but packaging is not required to include an expiration date.⁹

“It’s disturbing to see a known carcinogen detected in products that people are using to protect themselves from skin cancers,” says Julia Brody, executive director and senior scientist at the Silent Spring Institute. She points out that people are advised to reapply sunscreen hourly over their entire body throughout the day, starting at a young age and continuing throughout their lifetimes. “This study again shows how little we know about the presence of cancer-causing chemicals in everyday products,” says Brody, who was not involved in the study. “These exposures can potentially add up when you consider the multiple products people use on a regular basis.”

“I thought the crowdsourcing aspect was clever because it provides the chemical profile of what people are actually using,” says Nicole Deziel, an associate professor of epidemiology at the Yale School of Public Health, who also was not involved in the study. Deziel says the number of crowdsourced products sent in for testing—nearly 400 products over the span of one summer—speaks to the public interest in product safety. “It would be useful as a next step to calculate the estimated exposure and excess risk from this usage and contextualize that,” she says.

Deziel adds that adequate carcinogenicity testing has been conducted on only a small sliver of the tens of thousands of chemicals (or possibly more) that people may be exposed to.

“We could at least ensure,” she says, “that the small number of known human carcinogens like benzene are not contaminating products that people regularly apply to protect themselves from getting skin cancer.”

Wendee Nicole is an award-winning science writer based in San Diego, California. Her work has also appeared in *Nature*, *Scientific American*, and other publications.

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